Small Business Innovation Research/Small Business Tech Transfer

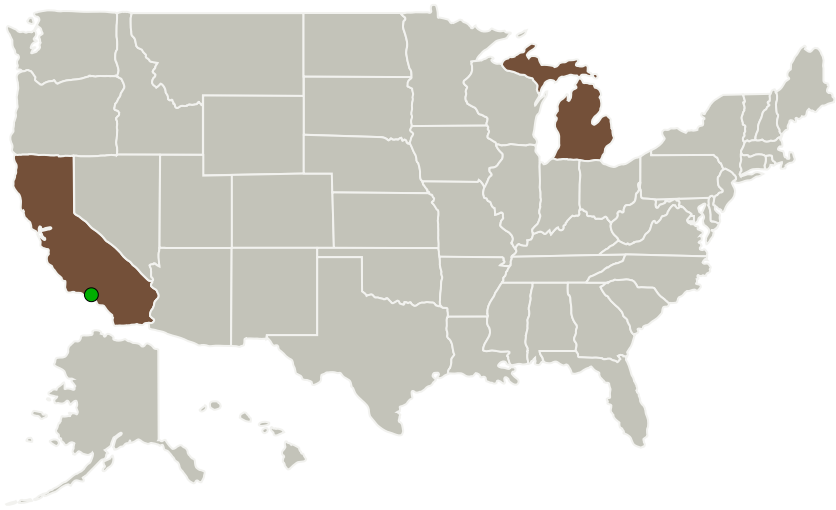
Ultrasonic Additive Manufacturing for Capillary Heat Transfer Devices and Integrated Heat Exchangers, Phase I

Completed Technology Project (2015 - 2015)

Project Introduction

The goal of this program is to demonstrate the use of Ultrasonic Additive Manufacturing (UAM) to 3D print aluminum structural panels with integrated thermal management passages. This includes pumped integrated heat exchangers for fluid loops, integrated heat pipes, and integrated wick systems. By combining two functions (structure/thermal) it will be shown that a lighter weight, higher performance solution can be built in a shorter time period. The project team will demonstrate technical feasibility in Phase I. In Phase II the team will use UAM to 3D print an aluminum structure capable of carrying structural loads with integrated thermal management passages as may be used in a pumped integrated heat exchanger. This demonstration unit will be delivered to NASA for testing at the completion of the Phase II contract.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Sheridan Solutions, LLC	Lead Organization	Industry Veteran-Owned Small Business (VOSB)	Saline, Michigan
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

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Primary U.S. Work Locations	
California	Michigan

Project Transitions

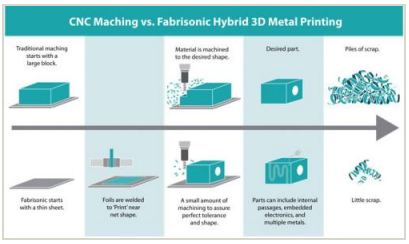
June 2015: Project Start

December 2015: Closed out

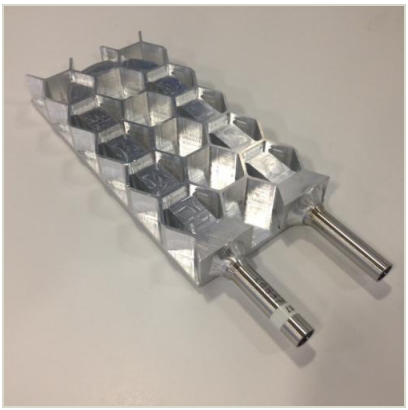
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139404)*

Images



Briefing Chart
Ultrasonic Additive Manufacturing for Capillary Heat Transfer Devices and Integrated Heat Exchangers Briefing Chart *(https://techport.nasa.gov/image/136546)*



Final Summary Chart Image
Ultrasonic Additive Manufacturing for Capillary Heat Transfer Devices and Integrated Heat Exchangers, Phase I Project Image *(https://techport.nasa.gov/image/127374)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Sheridan Solutions, LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
John J Sheridan

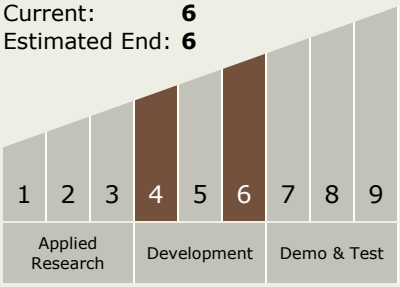
Co-Investigator:
John T Sheridan

Ultrasonic Additive Manufacturing for Capillary Heat Transfer Devices and Integrated Heat Exchangers, Phase I

Completed Technology Project (2015 - 2015)

Technology Maturity (TRL)

Start: **4**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.2 Thermal Control Components and Systems
    - TX14.2.2 Heat Transport

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System